



## CHAPTER 4

# Configuring the PA-E3

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To continue your PA-E3 port adapter installation, you must configure the serial interfaces. The instructions that follow apply to all supported platforms. Minor differences between the platforms—with Cisco IOS software commands—are noted.

This chapter contains the following sections:

- [Using the EXEC Command Interpreter, page 4-1](#)
- [Configuring the Interfaces, page 4-2](#)
- [Customizing the PA-E3, page 4-11](#)
- [Checking the Configuration, page 4-12](#)

## Using the EXEC Command Interpreter

You modify the configuration of your router through the software command interpreter called the EXEC (also called enable mode). You must enter the privileged level of the EXEC command interpreter with the **enable** command before you can use the **configure** command to configure a new interface or change the existing configuration of an interface. The system prompts you for a password if one has been set.

The system prompt for the privileged level ends with a pound sign (#) instead of an angle bracket (>). At the console terminal, use the following procedure to enter the privileged level:

---

**Step 1** At the user-level EXEC prompt, enter the **enable** command. The EXEC prompts you for a privileged-level password as follows:

```
Router> enable
```

```
Password:
```

**Step 2** Enter the password (the password is case sensitive). For security purposes, the password is not displayed. When you enter the correct password, the system displays the privileged-level system prompt (#):

```
Router#
```

---

To configure the new interfaces, proceed to the [“Configuring the Interfaces” section on page 4-2](#).

# Configuring the Interfaces

After you verify that the new PA-E3 is installed correctly (the enabled LED goes on), use the privileged-level **configure** command to configure the new interfaces. Have the following information available:

- Protocols you plan to route on each new interface
- IP addresses, if you plan to configure the interfaces for IP routing
- Bridging protocols you plan to use
- Clock timing source you plan to use for each new interface and clock speeds for external timing.

If you installed a new PA-E3 or if you want to change the configuration of an existing interface, you must enter configuration mode to configure the new interfaces. If you replaced a PA-E3 that was previously configured, the system recognizes the new interfaces and brings each of them up in their existing configurations.

For a summary of the configuration options available and instructions for configuring interfaces on a PA-E3, refer to the appropriate configuration publications listed in the [“Related Documentation” section on page viii](#).

You execute configuration commands from the privileged level of the EXEC command interpreter, which usually requires password access. Contact your system administrator, if necessary, to obtain password access. (See the [“Using the EXEC Command Interpreter” section on page 4-1](#) for an explanation of the privileged level of the EXEC.)

This section contains the following subsections:

- [Shutting Down an Interface, page 4-2](#)
- [Performing a Basic Interface Configuration, page 4-8](#)
- [Configuring Cyclic Redundancy Checks, page 4-10](#)

## Shutting Down an Interface

Before you remove an interface that you will not replace, replace a compact coaxial cable, or replace port adapters, use the **shutdown** command to shut down (disable) the interfaces to prevent anomalies when you reinstall the new or reconfigured interface processor. When you shut down an interface, it is designated administratively down in the **show** command displays.

Follow these steps to shut down an interface:

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**Step 1** Enter the privileged level of the EXEC command interpreter (also called enable mode). (See the [“Using the EXEC Command Interpreter” section on page 4-1](#) for instructions.)

**Step 2** At the privileged-level prompt, enter configuration mode and specify that the console terminal is the source of the configuration subcommands, as follows:

```
Router# configure terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)#
```

**Step 3** Shut down interfaces by entering the **interface serial** subcommand (followed by the interface address of the interface), and then enter the **shutdown** command.

When you have finished, press **Ctrl-Z**—hold down the **Control** key while you press **Z**—or enter **end** or **exit** to exit configuration mode and return to the EXEC command interpreter.

Table 4-1 shows the **shutdown** command syntax for the supported platforms:

**Table 4-1 Syntax of the shutdown Command for the Supported Platforms**

Platform	Command	Example
Catalyst RSM/VIP2 in Catalyst 5000 family switches	<b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/interface-port-number)  <b>shutdown</b>	The example is for interface 0 and interface 1 on a port adapter in port adapter slot 1.  Router(config-if)# <b>interface serial 1/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 1/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#
Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches	<b>interface</b> , followed by the <i>type (serial)</i> and <i>mod_num/bay/port</i> (module-slot-number/port-adapter-bay-number/interface-port-number)  <b>shutdown</b>	The example is for interface 0 and interface 1 on a port adapter in port adapter bay 0 of a FlexWAN module installed in slot 3.  Router(config-if)# <b>interface serial 3/0/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 3/0/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#
Cisco 7120 series routers	<b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/interface-port-number)  <b>shutdown</b>	The example is for interface 0 and interface 1 on a port adapter in port adapter slot 3.  Router(config-if)# <b>interface serial 3/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 3/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#
Cisco 7140 series routers	<b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/interface-port-number)  <b>shutdown</b>	The example is for interface 0 and interface 1 on a port adapter in port adapter slot 4.  Router(config-if)# <b>interface serial 4/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 4/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#
Cisco 7200 series routers and Cisco 7200 VXR routers	<b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/interface-port-number)  <b>shutdown</b>	The example is for interface 0 and interface 1 on a port adapter in port adapter slot 6.  Router(config-if)# <b>interface serial 6/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 6/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#
Cisco 7201 router	<b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/interface-port-number)  <b>shutdown</b>	The example is for interface 0 and interface 1 on a port adapter in slot 1.  Router(config)# <b>interface serial 1/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 1/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#

Table 4-1 Syntax of the shutdown Command for the Supported Platforms (continued)

Platform	Command	Example
Cisco uBR7223 router	<b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/interface-port-number)  <b>shutdown</b>	The example is for interface 0 and interface 1 on a port adapter in port adapter slot 1.  Router(config-if)# <b>interface serial 1/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 1/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#
Cisco uBR7246 router and Cisco uBR7246 VXR router	<b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/interface-port-number)  <b>shutdown</b>	The example is for interface 0 and interface 1 on a port adapter in port adapter slot 2.  Router(config-if)# <b>interface serial 2/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 2/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#
Cisco 7301 router	<b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/interface-port-number)  <b>shutdown</b>	The example is for interface 0 and interface 1 on a port adapter in slot 1.  Router(config)# <b>interface serial 1/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 1/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#
Cisco 7304 PCI Port Adapter Carrier Card in a Cisco 7304 router	<b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (module-slot-number/interface-port-number)  <b>shutdown</b>	The example is for interface 0 and interface 1 on a port adapter in a Cisco 7304 PCI Port Adapter Carrier Card in module slot 3 of a Cisco 7304 router.  Router(config-if)# <b>interface serial 3/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 3/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#
Cisco 7401ASR router	<b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port</i> (port-adapter-slot-number/interface-port-number)  <b>shutdown</b>	The example is for interface 0 and interface 1 on a port adapter in slot 1.  Router(config)# <b>interface serial 1/0</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 1/1</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#
VIP in Cisco 7000 series routers or Cisco 7500 series routers	<b>interface</b> , followed by the <i>type (serial)</i> and <i>slot/port adapter/port</i> (interface-processor-slot-number port-adapter-slot-number/interface-port-number)  <b>shutdown</b>	The example is for interface 1 and interface 0 on a port adapter in port adapter slot 1 of a VIP installed in interface processor slot 1.  Router(config-if)# <b>interface serial 1/1/1</b> Router(config-if)# <b>shutdown</b> Router(config-if)# <b>interface serial 1/1/0</b> Router(config-if)# <b>shutdown</b> <b>Ctrl-Z</b> Router#



**Note** If you need to shut down additional interfaces, enter the **interface serial** command (followed by the interface address of the interface) for each of the interfaces on your port adapter. Use the **no shutdown** command to enable the interface.

**Step 4** Write the new configuration to NVRAM as follows:

```
Router# copy running-config startup-config
[OK]
Router#
```

The system displays an OK message when the configuration has been stored in NVRAM.

**Step 5** Verify that new interfaces are now in the correct state (shut down) using the **show interfaces** command (followed by the interface type and interface address of the interface) to display the specific interface.

Table 4-2 provides examples of the **show interfaces serial** command for the supported platforms.

**Table 4-2** Examples of the **show interfaces** Command for the Supported Platforms

Platform	Command	Example
Catalyst RSM/VIP2 in Catalyst 5000 family switches	<b>show interfaces serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/interface-port-number)	The example is for interface 0 on a port adapter in port adapter slot 1.  Router# <b>show interfaces serial 1/0</b>  Serial 1/0 is administratively down, line protocol is down  [Additional display text omitted from this example]
Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches	<b>show interfaces serial</b> , followed by <i>mod_num/bay/port</i> (module-slot-number/port-adapter-bay-number/interface-port-number)	The example is for interface 0 on a port adapter in port adapter bay 0 of a FlexWAN module in module slot 3.  Router# <b>show interfaces serial 3/0/0</b>  Serial 3/0/0 is administratively down, line protocol is down  [Additional display text omitted from this example]
Cisco 7120 series routers	<b>show interfaces serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/interface-port-number)	The example is for interface 0 on a port adapter in port adapter slot 3.  Router# <b>show interfaces serial 3/0</b>  Serial 3/0 is administratively down, line protocol is down  [Additional display text omitted from this example]

Table 4-2 Examples of the show interfaces Command for the Supported Platforms (continued)

Platform	Command	Example
Cisco 7140 series routers	<b>show interfaces serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a port adapter in port adapter slot 4.  Router# <b>show interfaces serial 4/0</b>  Serial 4/0 is administratively down, line protocol is down  [Additional display text omitted from this example]
Cisco 7200 series routers and Cisco 7200 VXR routers	<b>show interfaces serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a port adapter in port adapter slot 6.  Router# <b>show interfaces serial 6/0</b>  Serial 6/0 is administratively down, line protocol is down  [Additional display text omitted from this example]
Cisco 7201 router	<b>show interfaces serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a port adapter in port adapter slot 1.  Router# <b>show interfaces serial 1/0</b>  Serial 1/0 is administratively down, line protocol is down  [Additional display text omitted from this example]
Cisco uBR7223 router	<b>show interfaces serial</b> , followed by <i>slot/port</i> (port-adapter-slot- number/interface-port-number)	The example is for interface 0 on a port adapter in port adapter slot 1.  Router# <b>show interfaces serial 1/0</b>  Serial 1/0 is administratively down, line protocol is down  [Additional display text omitted from this example]
Cisco uBR7246 router and Cisco uBR7246 VXR router	<b>show interfaces serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for interface 0 on a port adapter in port adapter slot 2.  Router# <b>show interfaces serial 2/0</b>  Serial 2/0 is administratively down, line protocol is down  [Additional display text omitted from this example]

Table 4-2 Examples of the `show interfaces` Command for the Supported Platforms (continued)

Platform	Command	Example
Cisco 7301 router	<b>show interfaces serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/interface-port-number)	The example is for interface 0 on a port adapter in port adapter slot 1. Router# <b>show interfaces serial 1/0</b>  Serial 1/0 is administratively down, line protocol is down  [Additional display text omitted from this example]
Cisco 7304 PCI Port Adapter Carrier Card in a Cisco 7304 router	<b>show interfaces serial</b> , followed by <i>slot/port</i> (module-slot-number/interface-port-number)	The example is for interface 0 on a port adapter in a Cisco 7304 PCI Port Adapter Carrier Card in module slot 3 of a Cisco 7304 router. Router(config-if)# <b>show interfaces serial 3/0</b>  Serial 3/0 is administratively down, line protocol is down  [Additional display text omitted from this example]
Cisco 7401ASR router	<b>show interfaces serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/interface-port-number)	The example is for interface 0 on a port adapter in port adapter slot 1. Router# <b>show interfaces serial 1/0</b>  Serial 1/0 is administratively down, line protocol is down  [Additional display text omitted from this example]
VIP in Cisco 7000 series router or Cisco 7500 series routers	<b>show interfaces serial</b> , followed by <i>slot/port adapter/port</i> (interface-processor-slot-number/port-adapter-slot-number/interface-port-number)	The example is for interface 0 on a port adapter in port adapter slot 1 of a VIP in interface processor slot 1. Router# <b>show interfaces serial 1/1/0</b>  Serial 1/1/0 is administratively down, line protocol is down  [Additional display text omitted from this example]

**Step 6** Re-enable interfaces by doing the following:

- a. Repeat Step 3 to re-enable an interface. Substitute the **no shutdown** command for the **shutdown** command.
- b. Repeat Step 4 to write the new configuration to memory. Use the **copy running-config startup-config** command.
- c. Repeat Step 5 to verify that the interfaces are in the correct state. Use the **show interfaces** command followed by the interface type and interface address of the interface.

For complete descriptions of software configuration commands, refer to the publications listed in the “Related Documentation” section on page viii.

## Performing a Basic Interface Configuration

Following are instructions for a basic configuration, which include enabling an interface, specifying IP routing, and setting up external timing on a DCE interface. You might also need to enter other configuration subcommands, depending on the requirements for your system configuration and the protocols you plan to route on the interface. For complete descriptions of configuration subcommands and the configuration options available for serial interfaces, refer to the appropriate software documentation.

In the following procedure, press the **Return** key after each step unless otherwise noted. At any time you can exit the privileged level and return to the user level by entering **disable** at the prompt as follows:

```
Router# disable
```

```
Router>
```

- Step 1** Enter configuration mode and specify that the console terminal is the source of the configuration subcommands, as follows:

```
Router# configure terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)#
```

- Step 2** Specify the first interface to configure by entering the **interface serial** subcommand, followed by the interface address of the interface you plan to configure. (The command for your port adapter may be different, for example, **interface atm**.)

Table 4-3 provides example of the **interface serial** subcommand for the supported platforms.

**Table 4-3** Examples of the interface serial Subcommand for the Supported Platforms

Platform	Command	Example
Catalyst RSM/VIP2 in Catalyst 5000 family switches	<b>interface serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for the first interface of a port adapter in port adapter slot 0.  Router(config)# <b>interface serial 0/0</b> Router(config-if)#
Catalyst 6000 family FlexWAN module in Catalyst 6000 family switches	<b>interface serial</b> , followed by <i>mod_num/bay/port</i> (module-slot-number/ port-adapter-bay-number/ interface-port-number)	The example is for the first interface of a port adapter in port adapter bay 0 of a FlexWAN module in module slot 3.  Router(config)# <b>interface serial 3/0/0</b> Router(config-if)#
Cisco 7120 series routers	<b>interface serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for the first interface of a port adapter in port adapter slot 3.  Router(config)# <b>interface serial 3/0</b> Router(config-if)#
Cisco 7140 series routers	<b>interface serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for the first interface of a port adapter in port adapter slot 4.  Router(config)# <b>interface serial 4/0</b> Router(config-if)#

**Table 4-3** Examples of the interface serial Subcommand for the Supported Platforms (continued)

Platform	Command	Example
Cisco 7200 series routers and Cisco 7200 VXR routers	<b>interface serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for the first interface of a port adapter in port adapter slot 6.  Router(config)# <b>interface serial 6/0</b> Router(config-if)#
Cisco 7201 router	<b>interface serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for the first interface of a port adapter in port adapter slot 1.  Router(config)# <b>interface serial 1/0</b> Router(config-if)#
Cisco uBR7223 router	<b>interface serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for the first interface of a port adapter in port adapter slot 1.  Router(config)# <b>interface serial 1/0</b> Router(config-if)#
Cisco uBR7246 router and Cisco uBR7246 VXR router	<b>interface serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for the first interface of a port adapter in port adapter slot 2.  Router(config)# <b>interface serial 2/0</b> Router(config-if)#
Cisco 7304 PCI Port Adapter Carrier Card in a Cisco 7304 router	<b>interface serial</b> , followed by <i>slot/port</i> (module-slot-number/ interface-port-number)	The example is for the first interface on a port adapter in a Cisco 7304 PCI Port Adapter Carrier Card in module slot 3 of a Cisco 7304 router.  Router(config)# <b>interface serial 3/0</b> Router(config-if)#
Cisco 7301 router and Cisco 7401ASR router	<b>interface serial</b> , followed by <i>slot/port</i> (port-adapter-slot-number/ interface-port-number)	The example is for the first interface of a port adapter in port adapter slot 1.  Router(config)# <b>interface serial 1/0</b> Router(config-if)#
VIP in Cisco 7000 series router or Cisco 7500 series routers	<b>interface serial</b> , followed by <i>slot/port adapter/port</i> (interface-processor-slot-number/ port-adapter-slot-number/ interface-port-number)	The example is for the first interface of a port adapter in port adapter slot 1 of a VIP in interface processor slot 1.  Router(config)# <b>interface serial 1/1/0</b> Router(config-if)#

- Step 3** Assign an IP address and subnet mask to the interface (if IP routing is enabled on the system) by using the **ip address** subcommand, as in the following example:

```
Router(config-if)# ip address 10.0.0.0 10.255.255.255
```

- Step 4** Add any additional configuration subcommands required to enable routing protocols and set the interface characteristics.
- Step 5** Re-enable the interfaces using the **no shutdown** command. (See the “[Shutting Down an Interface](#)” section on page 4-2.)
- Step 6** Configure all additional port adapter interfaces as required.
- Step 7** After including all of the configuration subcommands to complete your configuration, press **Ctrl-Z**—hold down the **Control** key while you press **Z**—or enter **end** or **exit** to exit configuration mode and return to the EXEC command interpreter prompt.

**Step 8** Write the new configuration to NVRAM as follows:

```
Router# copy running-config startup-config
[OK]
Router#
```

This completes the procedure for creating a basic configuration.

The PA-E3 supports internal or external clocking, and the clock rate is fixed at 32,064 kbit/s per ITU G.703 and cannot be changed.

## Configuring Cyclic Redundancy Checks

Cyclic redundancy check (CRC) is an error-checking technique that uses a calculated numeric value to detect errors in transmitted data. All interfaces use a 16-bit CRC (CRC-CITT) by default but also support a 32-bit CRC. The sender of a data frame calculates the frame check sequence (FCS). Before it sends a frame, the sender appends the FCS value to the message. The receiver recalculates the FCS and compares its calculation to the FCS from the sender. If there is a difference between the two calculations, the receiver assumes that a transmission error occurred and sends a request to the sender to resend the frame.

Table 4-4 summarizes CRC commands.

**Table 4-4** CRC Commands

Purpose	Command	Example
Enable 32-bit CRC.	<b>crc size</b>	The example enables 32-bit CRD on a serial interface: <pre>Router(config)# interface serial 3/0 Router(config-if)# crc 32</pre>
Return to default 16-bit CRC.	<b>no crc size</b>	The example disables 32-bit CRD on a serial interface and returns to the default 16-bit CRC: <pre>Router(config)# interface serial 3/0 Router(config-if)# no crc 32</pre>

Enable 32-bit CRC using the **crc 32** command. Before you can enable 32-bit CRC, you must use the **interface serial** command (followed by the interface address of the interface) to select the interface on which you want to enable 32-bit CRC. This command functions in the same way on all supported platforms.

In the example that follows, 32-bit CRC is specified:

```
Router(config-if)# crc 32
```

The preceding command example applies to all systems in which the PA-E3 is supported.

Use the **no crc 32** command to disable CRC-32 and return the interface to the default CRC-16 (CRC-CITT) setting.

When you have finished, press **Ctrl-Z**—hold down the **Control** key while you press **Z**—or enter **end** or **exit** to exit configuration mode and return to the EXEC command interpreter prompt.

Then write the new configuration to NVRAM using the **copy running-config startup-config** command.

For command descriptions, refer to the *Configuration Fundamentals Configuration Guide* on Cisco.com. For more information, see the “[Related Documentation](#)” section on page viii.

## Customizing the PA-E3

Depending on the requirements for your system configuration and the protocols you plan to route on the interface, you might need to enter configuration commands to customize the PA-E3. Most of the features you can customize have default values that will probably suit your environment and need not be changed. However, if you need to customize your configuration, see the following sections:

- [Setting the Bandwidth, page 4-11](#)
- [Defining the DSU Mode, page 4-11](#)
- [Defining Set Bit \(National\), page 4-12](#)
- [Enabling E3 Scrambling, page 4-12](#)
- [Specifying E3 Framing, page 4-12](#)

### Setting the Bandwidth

In interface configuration mode, reduce effective bandwidth (range of 22 to 34010 kilobits per second) by entering the **dsu bandwidth** configuration subcommand, as in the following example:

```
router(config-if)# dsu bandwidth 16000
```

Use the **no** form of this command to return to the default, 34010.

**Note**

The local port configuration must match the remote port configuration. For example, if you reduce the effective bandwidth to 16000 on the local port, you must do the same on the remote port.

### Defining the DSU Mode

In interface configuration mode, define the DSU interoperability mode by entering the **dsu mode [0 | 1]** configuration subcommand, as in the following example:

```
router(config-if)# dsu mode 1
```

Use the **no** form of this command to return to the default, 0.

**Note**

The local port configuration must match the remote port configuration. For example, if you define the DSU interoperability mode as 1 on the local port, you must do the same on the remote port. You need to know what type of DSU is at the remote port to find out if it interoperates with the PA-E3. For E3 serial interfaces, specify mode 0 for connection from a PA-E3 to another PA-E3 or a Digital Link DSU (DL3100). Specify mode 1 for connection from a PA-E3 to a Kentrox DSU.

Also refer to the [“Interoperability Guidelines for PA-E3 DSUs” section on page 1-20](#) section for information regarding DSU feature compatibilities.

## Defining Set Bit (National)

In interface configuration mode, define set bit in G751 frame (national bit) by entering the **national bit** [0 | 1] configuration subcommand, as in the following example:

```
router(config-if)# national bit 1
```

Use the **no** form of this command to return to the default, which is 0.

## Enabling E3 Scrambling

In interface configuration mode, enable E3 scrambling by entering the **scramble** configuration subcommand, as in the following example:

```
router(config-if)# scramble
```

Use the **no** form of this command to restore the default value, which is disabled.



### Note

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The local port configuration must match the remote port configuration. For example, if you enable scrambling on the local port, you must do the same on the remote port.

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## Specifying E3 Framing

In interface configuration mode, specify E3 framing by entering the **framing {g751 | bypass}** configuration subcommand, as in the following example:

```
router(config-if)# framing g751
```

Use the **no** form of this command to return to the default, which is G.751 framing.



### Note

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If you use the **bypass** option, scrambling must be set to the default, disabled; the DSU mode must be set to the default, 0; and the DSU bandwidth must be set to the default, 34010.

---

## Checking the Configuration

After configuring the new interface, use the **show** commands to display the status of the new interface or all interfaces, and use the **ping** and **loopback** commands to check connectivity. This section includes the following subsections:

- [Using show Commands to Verify the New Interface Status, page 4-13](#)
- [Using the ping Command to Verify Network Connectivity, page 4-29](#)
- [Using loopback Commands, page 4-29](#)

## Using show Commands to Verify the New Interface Status

Table 4-5 demonstrates how you can use the **show** commands to verify that new interfaces are configured and operating correctly and that the PA-E3 appears in them correctly. Sample displays of the output of selected **show** commands appear in the sections that follow. For complete command descriptions and examples, refer to the publications listed in the “[Related Documentation](#)” section on page viii.


**Note**

The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

**Table 4-5** Using Show Commands

Command	Function	Example
<b>show version</b> or <b>show hardware</b>	Displays system hardware configuration, the number of each interface type installed, Cisco IOS software version, names and sources of configuration files, and boot images	Router# <b>show version</b>
<b>show controllers</b>	Displays all the current interface processors and their interfaces	Router# <b>show controllers</b>
<b>show diag slot</b> <b>Note</b> The <i>slot</i> argument is not required with Catalyst 5000 family switches.	Displays types of port adapters installed in your system and information about a specific port adapter slot, interface processor slot, or chassis slot	Router# <b>show diag 2</b>
<b>show interfaces type 0 or 1/ interface-port-number</b>	Displays status information about a specific type of interface (for example, serial) on a Catalyst RSM/VIP2	Router# <b>show interfaces serial 1/0</b>
<b>show interfaces type module-slot-number/port-adapter-bay-number/ interface-port-number</b>	Displays status information about a specific type of interface (for example, serial) on a Catalyst 6000 family FlexWAN module	Router# <b>show interfaces serial 3/0/0</b>
<b>show interfaces type 3/interface-port-number</b>	Displays status information about a specific type of interface (for example, serial) in a Cisco 7120 series router	Router# <b>show interfaces serial 3/1</b>
<b>show interfaces type 4/interface-port-number</b>	Displays status information about a specific type of interface (for example, serial) in a Cisco 7140 series router	Router# <b>show interfaces serial 4/1</b>

Table 4-5 Using Show Commands (continued)

Command	Function	Example
<b>show interfaces</b> <i>type port-adapter-slot-number/interface-port-number</i>	Displays status information about a specific type of interface (for example, serial) in a Cisco 7200 series router, Cisco 7200 VXR router, Cisco 7201 router, Cisco 7301 router, and Cisco 7401ASR router	Router# <b>show interfaces serial 1/0</b>
<b>show interfaces</b> <i>type 1/interface-port-number</i>	Displays status information about a specific type of interface (for example, serial) in a Cisco uBR7223 router	Router# <b>show interfaces serial 1/1</b>
<b>show interfaces</b> <i>type 1 or 2/interface-port-number</i>	Displays status information about a specific type of interface (for example, serial) in a Cisco uBR7246 router and Cisco uBR7246 VXR router	Router# <b>show interfaces serial 2/0</b>
<b>show interfaces</b> <i>type 2 or 3 or 4 or 5/interface-port-number</i>	Displays status information about a serial interface on a Cisco 7304 PCI Port Adapter Carrier Card in a Cisco 7304 router	Router# <b>show interfaces serial 3/0</b>
<b>show interfaces</b> <i>type interface-processor-slot-number/port-adapter-slot-number/interface-port-number</i>	Displays status information about a specific type of interface (for example, serial) on a VIP in a Cisco 7000 series router or Cisco 7500 series router	Router# <b>show interfaces serial 3/1/0</b>
<b>show protocols</b>	Displays protocols configured for the entire system and for specific interfaces	Router# <b>show protocols</b>
<b>show running-config</b>	Displays the running configuration file	Router# <b>show running-config</b>
<b>show startup-config</b>	Displays the configuration stored in NVRAM	Router# <b>show startup-config</b>

If an interface is shut down and you configured it as up, or if the displays indicate that the hardware is not functioning properly, ensure that the interface is properly connected and terminated. If you still have problems bringing up the interface, contact a service representative for assistance. This section includes the following subsections:

- [Using the show version or show hardware Commands, page 4-15](#)
- [Using the show diag Command, page 4-20](#)
- [Using the show interfaces Command, page 4-23](#)

These subsections offer some platform-specific output examples using the **show** commands. Choose the subsection appropriate for your system. Proceed to the [“Using the ping Command to Verify Network Connectivity”](#) section on [page 4-29](#) when you have finished using the **show** commands.

## Using the show version or show hardware Commands

Display the configuration of the system hardware, the number of each interface type installed, the Cisco IOS software version, the names and sources of configuration files, and the boot images, using the **show version** (or **show hardware**) command.



### Note

The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

The following sections provide output of the **show version** command for some of the supported platforms:

- [Catalyst RSM/VIP2 in Catalyst 5000 Family Switches—Example Output of the show version Command, page 4-15](#)
- [Catalyst 6000 Family FlexWAN Module—Example Output of the show version Command, page 4-16](#)
- [Cisco 7100 Series Routers—Example Output of the show version Command, page 4-16](#)
- [Cisco 7200 Series Routers, Cisco 7200 VXR Routers, and Cisco uBR7200 Series Routers—Example Output of the show version Command, page 4-17](#)
- [Cisco 7201 Router—Example Output of the show version Command, page 4-18](#)
- [Cisco 7401ASR Router—Example Output of the show version Command, page 4-18](#)
- [VIP in Cisco 7000 Series Routers and Cisco 7500 Series Routers—Example Output of the show version Command, page 4-19](#)

### Catalyst RSM/VIP2 in Catalyst 5000 Family Switches—Example Output of the show version Command

Following is an example of the **show version** command from a Catalyst 5000 family switch with a PA-E3 installed:

```
Switch# show version
Cisco Internetwork Operating System Software
IOS (tm) C5RSM Software (C5RSM-JSV-M), Version 11.2(9)P
Copyright (c) 1986-1997 by cisco Systems, Inc.
Compiled True 24-Jun-97 17:09 by biff
Image text-base: 0x600108E0, data-base: 0x6095E000

ROM: System Bootstrap, Version 11.2(15707)
BOOTFLASH: C5RSM Software (C5RSM-JSV-M), Version 11.2

Router uptime is 17 hours, 17 minutes
System restarted by reload
System image file is "c5rsm-jsv-mz.7P", booted via tftp

cisco RSP2 (R4700) processor with 32768K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0
Last reset from power-on
G.703/E1 software, Version 1.0.
SuperLAT software copyright 1990 by Meridian Technology Corp).
Bridging software.
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
TN3270 Emulation software.
1 C5IP controller (15 Vlan).
2 MIP controllers (4 E1).
1 VIP2 controller (2 E1) (4 Token Ring).
6 Channelized E1/PRI ports.
```

```

123K bytes of non-volatile configuration memory.

16384K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x100

```

### Catalyst 6000 Family FlexWAN Module—Example Output of the show version Command

Following is an example of the **show version** command from a Catalyst 6000 family switch with a PA-E3 installed:

```

Router# show version
Cisco Internetwork Operating System Software
IOS (tm) MSFC Software (C6MSFC-JSV-M), Experimental Version 12.1(20000209:134547)
[amcrae-cosmos_e_nightly 163]
Copyright (c) 1986-2000 by cisco Systems, Inc.
Compiled Wed 09-Feb-00 07:10 by
Image text-base: 0x60008900, data-base: 0x6140E000

ROM: System Bootstrap, Version 12.0(3)XE, RELEASE SOFTWARE

const-uut uptime is 5 minutes
System returned to ROM by reload
System image file is "bootflash:c6msfc-jsv-mz.Feb9"

cisco Cat6k-MSFC (R5000) processor with 122880K/8192K bytes of memory.
Processor board ID SAD03457061
R5000 CPU at 200Mhz, Implementation 35, Rev 2.1, 512KB L2 Cache
Last reset from power-on
Channelized E1, Version 1.0.
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
Primary Rate ISDN software, Version 1.1.
6 FlexWAN controllers (13 Serial)(8 E1)(8 T1)(2 HSSI)(2 ATM)(1 Channelized T3)(1
Channelized E3)(2 POS).
1 Virtual Ethernet/IEEE 802.3 interface(s)
17 Serial network interface(s)
2 HSSI network interface(s)
2 ATM network interface(s)
2 Packet over SONET network interface(s)
1 Channelized T3 port(s)
1 Channelized E3 port(s)
123K bytes of non-volatile configuration memory.
4096K bytes of packet SRAM memory.

16384K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x1

```

### Cisco 7100 Series Routers—Example Output of the show version Command

Following is an example of the **show version** command from a Cisco 7120 series router with a PA-E3 installed:

```

Router# show version
Cisco Internetwork Operating System Software
IOS (tm) EGR Software (c7100-IS-M), Version 12.0(4)XE, EARLY DEPLOYMENT
RELEASE)
TAC:Home:SW:IOS:Specials for info
Copyright (c) 1986-1999 by cisco Systems, Inc.

```

```

Compiled Thu 10-Jun-99 15:32 by linda
Image text-base:0x60008900, data-base:0x60D8E000

ROM:System Bootstrap, Version 12.0(19990720:023243)
[gautham-conn_4xe-PRE_ALPHE
BOOTFLASH:EGR Software (c7100-IS-M), Version 12.0(4)XE, EARLY DEPLOYMENT
RELEA)

Router uptime is 24 minutes
System restarted by power-on
System image file is "disk0:c7100-is-mz.120-4.XE"

cisco 7120-bad (EGR) processor with 61440K/69632K bytes of memory.
R527x CPU at 225Mhz, Implementation 40, Rev 10.0, 2048KB L2 Cache
Last reset from power-on
Bridging software.
X.25 software, Version 3.0.0.
2 FastEthernet/IEEE 802.3 interface(s)
125K bytes of non-volatile configuration memory.

40960K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x2000

```

### Cisco 7200 Series Routers, Cisco 7200 VXR Routers, and Cisco uBR7200 Series Routers—Example Output of the show version Command

Following is an example of the **show version** command from a Cisco 7200 series router with a PA-E3 installed:

```

Router# show version
Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-J-M), Version 11.1(7)CA [biff 105]
Copyright (c) 1986-1996 by cisco Systems, Inc.
Compiled Sun 04-Aug-96 06:00 by biff
Image text-base: 0x600088A0, data-base: 0x605A4000

ROM: System Bootstrap, Version 11.1(7)CA RELEASED SOFTWARE

Router uptime is 4 hours, 22 minutes
System restarted by reload
System image file is "c7200-j-mz", booted via slot0

cisco 7206 (NPE150) processor with 12288K/4096K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0 (Level 2 Cache)
Last reset from power-on
Bridging software.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
TN3270 Emulation software (copyright 1994 by TGV INC).
Chassis Interface.
4 Ethernet/IEEE 802.3 interfaces.
2 FastEthernet/IEEE 802.3 interfaces.
4 Token Ring /IEEE802.5 interfaces.
12 Serial network interfaces.
1 Compression port adapter.
125K bytes of non-volatile configuration memory.
1024K bytes of packet SRAM memory.

20480K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x2

```

### Cisco 7201 Router—Example Output of the show version Command

Following is an example of the **show version** command from a Cisco 7201 router:

```
Router# show version
Cisco IOS Software, 7200 Software (C7200P-ADVENTERPRISEK9-M), Version
12.4(biffDEV.061001), INTERIM SOFTWARE Copyright (c) 1986-2006 by Cisco Systems, Inc.
Compiled Sun 01-Oct-06 23:42 by biff
ROM: System Bootstrap, Version 12.4(4r)XD5, RELEASE SOFTWARE (fc1)
BOOTLDR: Cisco IOS Software, 7200 Software (C7200P-KBOOT-M), Version 12.4(TAZ3DEV.060927),
INTERIM SOFTWARE
c7201alphan uptime is 5 days, 18 hours, 32 minutes System returned to ROM by power-on
System image file is "disk0:c7200p-adventerprisek9-mz.2006-10-01.biffdev"
This product contains cryptographic features and is subject to United States and local
country laws governing import, export, transfer and use. Delivery of Cisco cryptographic
products does not imply third-party authority to import, export, distribute or use
encryption.
Importers, exporters, distributors and users are responsible for compliance with U.S. and
local country laws. By using this product you agree to comply with applicable laws and
regulations. If you are unable to comply with U.S. and local laws, return this product
immediately.
A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html
If you require further assistance please contact us by sending email to export@cisco.com.
Cisco 7201 (c7201) processor (revision A) with 917504K/65536K bytes of memory.
Processor board ID 222222222222
MPC7448 CPU at 1666Mhz, Implementation 0, Rev 2.2
1 slot midplane, Version 2.255
Last reset from power-on
1 FastEthernet interface
4 Gigabit Ethernet interfaces
2045K bytes of NVRAM.
62443K bytes of USB Flash usbflash0 (Read/Write)
250880K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
65536K bytes of Flash internal SIMM (Sector size 512K).
Configuration register is 0x2
```

### Cisco 7401ASR Router—Example Output of the show version Command

Following is an example of the **show version** command from a Cisco 7401ASR router with a PA-E3 installed:

```
Router# show version
Cisco Internetwork Operating System Software
IOS (tm) 7401ASR Software (C7401ASR-J-M), Version 11.1(7)CA [biff 105]
Copyright (c) 1986-1996 by cisco Systems, Inc.
Compiled Sun 04-Aug-96 06:00 by biff
Image text-base: 0x600088A0, data-base: 0x605A4000

ROM: System Bootstrap, Version 11.1(7)CA RELEASED SOFTWARE

Router uptime is 4 hours, 22 minutes
System restarted by reload
System image file is "c7401ASR-j-mz", booted via slot0

cisco 7401ASR processor with 12288K/4096K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0 (Level 2 Cache)
Last reset from power-on
Bridging software.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
```

```

X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
TN3270 Emulation software (copyright 1994 by TGV INC).
Chassis Interface.
4 Ethernet/IEEE 802.3 interfaces.
2 FastEthernet/IEEE 802.3 interfaces.
4 Token Ring /IEEE802.5 interfaces.
12 Serial network interfaces.
1 Compression port adapter.
125K bytes of non-volatile configuration memory.
1024K bytes of packet SRAM memory.

20480K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).Configuration register is 0x2

```

### VIP in Cisco 7000 Series Routers and Cisco 7500 Series Routers—Example Output of the show version Command

Following is an example of the **show version** command from a Cisco 7500 series router with a PA-E3 installed:

```

Router# show version
Cisco Internetwork Operating System Software
IOS (tm) GS Software (RSP-A), Version 11.1(7)CA [biff 125]
Copyright (c) 1986-1996 by cisco Systems, Inc.
Compiled Sat 10-Aug-96 17:56 by biff
Image text-base: 0x600108A0, data-base: 0x60952000

ROM: System Bootstrap, Version 5.3(16645) [biff 571], RELEASE SOFTWARE
ROM: GS Software (RSP-BOOT-M), Version 11.1(7)CA, RELEASE SOFTWARE (fc1)

Router uptime is 5 days, 4 minutes
System restarted by reload
System image file is "rsp-jv-mz", booted via slot0

cisco RSP2 (R4600) processor with 16384K bytes of memory.
R4600 processor, Implementation 32, Revision 2.0
Last reset from power-on
G.703/E1 software, Version 1.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
Bridging software.
X.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
TN3270 Emulation software (copyright 1994 by TGV Inc).
Chassis Interface.
1 EIP controller (6 Ethernet).
1 VIP2 controller (8 Ethernet)(1 HSSI).
14 Ethernet/IEEE 802.3 interfaces.
1 HSSI network interface.
125K bytes of non-volatile configuration memory.

8192K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x0

```

## Using the show diag Command

Display the types of port adapters installed in your system (and specific information about each) using the **show diag slot** command, where *slot* is the *port adapter slot* in Catalyst 5000 family switches, Cisco 7100 series routers, Cisco 7200 series routers, Cisco 7200 VXR routers, Cisco uBR7200 series routers, Cisco 7201 router, Cisco 7301 router, or Cisco 7401ASR router, the *module slot* in a Cisco 7304 PCI Port Adapter Carrier Card in a Cisco 7304 router, and the *interface processor slot* in Cisco 7000 series routers or Cisco 7500 series routers with a VIP. In the FlexWAN module, the **show diag** command is used without the *slot* designation.


**Note**

The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.


**Note**

The *slot* argument is not required for Catalyst 5000 family switches.

The following sections provide output of the **show diag** command for some of the supported platforms:

- [Catalyst RSM/VIP2 in Catalyst 5000 Family Switches—Example Output of the show diag Command, page 4-20](#)
- [Catalyst 6000 Family FlexWAN Module—Example Output of the show diag Command, page 4-21](#)
- [Cisco 7100 Series Routers, page 4-21](#)
- [Cisco 7200 Series Routers, Cisco 7200 VXR Routers, and Cisco uBR7200 Series Routers—Example Output of the show diag Command, page 4-21](#)
- [Cisco 7201 Router—Example Output of the show diag Command, page 4-22](#)
- [Cisco 7401ASR Router—Example Output of the show diag Command, page 4-22](#)
- [VIP in Cisco 7000 Series Routers and Cisco 7500 Series Routers—Example Output of the show diag Command, page 4-23](#)

### Catalyst RSM/VIP2 in Catalyst 5000 Family Switches—Example Output of the show diag Command

Following is an example of the **show diag** command that shows a PA-E3 on a Catalyst RSM/VIP2:

```
Switch# show diag 6
Slot 6:
  E3 PA port adapter, 2 ports
  Port adapter is analyzed
  Port adapter insertion time 2w0d ago
  EEPROM contents at hardware discovery:
  Hardware revision 1.0          Board revision B0
  Serial number 14061433        Part number 73-2324-03
  Test history 0x0              RMA number 00-00-00
  EEPROM format version 1
  EEPROM contents (hex):
    0x20:01 52 01 00 00 D6 8F 79 49 09 14 03 00 00 00 00
    0x30:58 00 00 00 99 05 06 00 FF FF FF FF FF FF FF FF
```

## Catalyst 6000 Family FlexWAN Module—Example Output of the show diag Command

Following is an example of the **show diag** command that shows a PA-E3 on a Catalyst 6000 family FlexWAN module:

```
Router# show diag

(display text omitted)

Slot 8: Logical_index 17
Board is analyzed ipc ready FlexWAN controller

Slot database information:
Flags: 0x2004Insertion time: unknown

CWAN Controller Memory Size: Unknown

PA Bay 1 Information:
E3 PA port adapter, 2 ports
EEPROM format version 0
HW rev 0.00, Board revision UNKNOWN
Serial number: 00000000 Part number: 00-0000-00
```

## Cisco 7100 Series Routers

Following is an example of the **show diag** command that shows a Fast Ethernet port adapter in port adapter slot 3 of a Cisco 7120 series router:

```
Router# show diag 3
Slot 3:
10/100 Fast-ethernet with RJ45 Integrated port adapter, 2 ports
Integrated port adapter is analyzed
EEPROM contents at hardware discovery:
Hardware revision 255.255 Board revision UNKNOWN
EEPROM format version 1
EEPROM contents (hex):
0x20:01 D3 FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x30:FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```



### Note

To use the **show diag** command with the Cisco 7140 series router, replace the slot argument **3** with **4**.

## Cisco 7200 Series Routers, Cisco 7200 VXR Routers, and Cisco uBR7200 Series Routers—Example Output of the show diag Command

Following is an example of the **show diag** command that shows a PA-E3 in port adapter slot 1 of a Cisco 7200 series router:

```
Router# show diag 1
Slot 1:
E3 PA port adapter, 2 ports
Port adapter is analyzed
Port adapter insertion time 2w0d ago
EEPROM contents at hardware discovery:
Hardware revision 1.0 Board revision B0
Serial number 14061433 Part number 73-2324-03
Test history 0x0 RMA number 00-00-00
EEPROM format version 1
EEPROM contents (hex):
0x20:01 52 01 00 00 D6 8F 79 49 09 14 03 00 00 00 00
```

```
0x30:58 00 00 00 99 05 06 00 FF FF FF FF FF FF FF FF
```

### Cisco 7201 Router—Example Output of the show diag Command

Following is an example of the **show diag** command from a Cisco 7201 router:

```
Router# show diag 1
Slot 1:
  Dual OC3 POS Port adapter, 2 ports
  Port adapter is analyzed
  Port adapter insertion time 00:02:19 ago
  EEPROM contents at hardware discovery:
  Hardware Revision : 1.0
  PCB Serial Number : JAE07520DYL
  Part Number : 73-8220-02
  Board Revision : A0
  RMA Test History : 00
  RMA Number : 0-0-0-0
  RMA History : 00
  Deviation Number : 0
  Product (FRU) Number : PA-POS-2OC3
  Top Assy. Part Number : 800-21857-02
  EEPROM format version 4
  EEPROM contents (hex):
    0x00: 04 FF 40 03 E3 41 01 00 C1 8B 4A 41 45 30 37 35
    0x10: 32 30 44 59 4C 82 49 20 1C 02 42 41 30 03 00 81
    0x20: 00 00 00 00 04 00 88 00 00 00 00 CB 94 50 41 2D
    0x30: 50 4F 53 2D 32 4F 43 33 20 20 20 20 20 20 20 20
    0x40: 20 C0 46 03 20 00 55 61 02 FF FF FF FF FF FF FF
    0x50: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
    0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
    0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```

### Cisco 7401ASR Router—Example Output of the show diag Command

Following is an example of the **show diag** command that shows a PA-E3 in port adapter slot 1 of a Cisco 7401ASR router:

```
Router# show diag 1
Slot 1:
  E3 PA port adapter, 2 ports
  Port adapter is analyzed
  Port adapter insertion time 2w0d ago
  EEPROM contents at hardware discovery:
  Hardware revision 1.0          Board revision B0
  Serial number 14061433        Part number 73-2324-03
  Test history 0x0              RMA number 00-00-00
  EEPROM format version 1
  EEPROM contents (hex):
    0x20:01 52 01 00 00 D6 8F 79 49 09 14 03 00 00 00 00
    0x30:58 00 00 00 99 05 06 00 FF FF FF FF FF FF FF FF
```

## VIP in Cisco 7000 Series Routers and Cisco 7500 Series Routers—Example Output of the show diag Command

Following is an example of the **show diag** command that shows a PA-E3 in port adapter slot 1 on a VIP2 in interface processor slot 1:

```
Router# show diag 1
Slot 1:
E3 PA port adapter, 2 ports
Port adapter is analyzed
Port adapter insertion time 2w0d ago
EEPROM contents at hardware discovery:
Hardware revision 1.0          Board revision B0
Serial number 14061433        Part number 73-2324-03
Test history 0x0              RMA number 00-00-00
EEPROM format version 1
EEPROM contents (hex):
0x20:01 52 01 00 00 D6 8F 79 49 09 14 03 00 00 00 00
0x30:58 00 00 00 99 05 06 00 FF FF FF FF FF FF FF FF
```

## Using the show interfaces Command

Display status information (including the physical slot and interface address) for the interfaces you specify using the **show interfaces** command.

For complete descriptions of interface subcommands and the configuration options available for interfaces, refer to the publications listed in the “[Related Documentation](#)” section on page viii.



### Note

The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

The following sections provide output of the **show interfaces** command for some of the supported platforms:

- [Catalyst RSM/VIP2 in Catalyst 5000 Family Switches—Example Output of the show interfaces Command, page 4-24](#)
- [Catalyst 6000 Family FlexWAN Module—Example Output of the show interfaces Command, page 4-24](#)
- [Cisco 7100 Series Routers—Example Output of the show interfaces Command, page 4-25](#)
- [Cisco 7200 Series Routers, Cisco 7200 VXR Routers, and Cisco uBR7200 Series Routers—Example Output of the show interfaces Command, page 4-26](#)
- [Cisco 7201 Router—Example Output of the show interfaces Command, page 4-27](#)
- [Cisco 7401ASR Router—Example Output of the show interfaces Command, page 4-27](#)
- [VIP in Cisco 7000 Series Routers or Cisco 7500 Series Routers—Example Output of the show interfaces Command, page 4-28](#)

### Catalyst RSM/VIP2 in Catalyst 5000 Family Switches—Example Output of the show interfaces Command

Following are examples of the **show interfaces serial** command from a Catalyst 5000 family switch. In these examples, the eight serial interfaces (0 to 7) are on a port adapter in port adapter slot 1 of a Catalyst RSM/VIP2; also, most of the status information for each interface is omitted. (Interfaces are administratively shut down until you enable them.)

```
Switch# show interfaces serial 1/0
Serial1/0 is up, line protocol is up
  Hardware is cyBus Serial
  Internet address is 10.0.0.1
    MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive not set
[Additional display text omitted from this example]
```

```
Switch# show interfaces serial 1/1
Serial1/1 is up, line protocol is up
  Hardware is cyBus Serial
  Internet address is 10.0.0.1
    MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive not set
[Additional display text omitted from this example]
```

```
Switch# show interfaces serial 1/2
Serial1/2 is up, line protocol is up
  Hardware is cyBus Serial
  Internet address is 10.0.0.2
    MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive not set
[Additional display text for remaining interfaces omitted]
```

### Catalyst 6000 Family FlexWAN Module—Example Output of the show interfaces Command

Following are examples of the **show interfaces serial** command from a Catalyst 6000 family switch. In these examples, the serial interfaces are on a port adapter in port adapter bay 1 of a Catalyst 6000 family FlexWAN module in module slot 8; also, most of the status information for each interface is omitted. (Interfaces are administratively shut down until you enable them.)

```
Router# show interfaces serial 8/1/0
Serial8/1/0 is administratively down, line protocol is down
  Hardware is Serial
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, crc 16, loopback not set
(display text omitted)
```

```
Router# show interfaces serial 8/1/1
Serial8/1/1 is administratively down, line protocol is down
  Hardware is Serial
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, crc 16, loopback not set
(display text omitted)
```

## Cisco 7100 Series Routers—Example Output of the show interfaces Command

Following are examples of the **show interfaces serial** command from a Cisco 7120 series router. In these examples, the eight serial interfaces (0 to 7) are on a port adapter in port adapter slot 3 of a Cisco 7120 series router; also, most of the status information for each interface is omitted. (Interfaces are administratively shut down until you enable them.)

```
Router# show interfaces serial 3/0
Serial3/0 is up, line protocol is up
  Hardware is M8T-RS232
  Internet address is 10.0.0.0
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
[Additional display text omitted from this example]
```

```
Router# show interfaces serial 3/1
Serial3/1 is up, line protocol is up
  Hardware is M8T-RS232
  Internet address is 10.0.0.1
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
[Additional display text omitted from this example]
```

```
Router# show interfaces serial 3/2
Serial3/2 is up, line protocol is up
  Hardware is M8T-RS232
  Internet address is 10.0.0.2
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
[Additional display text for remaining interfaces omitted]
```



### Note

To use the **show interfaces serial** command with the Cisco 7140 series router, replace the interface address arguments **3/0**, **3/1**, **3/2**, **3/3**, **3/4**, **3/5**, **3/6**, and **3/7** with **4/0**, **4/1**, **4/2**, **4/3**, **4/4**, **4/5**, **4/6**, and **4/7**, respectively.

Following is an example of the **show interfaces serial** command, which shows all of the information specific to interface 0 on a PA-E3 installed in port adapter slot 3 of a Cisco 7120 series router:

```
Router# show interfaces serial 3/0
Serial3/0 is up, line protocol is up
  Hardware is M8T-RS232
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
  Last input never, output 1d17h, output hang never
  Last clearing of "show interface" counters never
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    0 packets input, 0 bytes, 0 no buffer
  Received 0 broadcasts, 0 runts, 0 giants
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  24 packets output, 5137 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 output buffer failures, 0 output buffers swapped out
    0 carrier transitions      DCD=down  DSR=down  DTR=down  RTS=down  CTS=down
```



### Note

To use the **show interfaces serial** command with the Cisco 7140 series router, replace the interface address argument **3/0** with **4/0**.

## Cisco 7200 Series Routers, Cisco 7200 VXR Routers, and Cisco uBR7200 Series Routers—Example Output of the show interfaces Command

Following are examples of the **show interfaces serial** command from a Cisco 7200 series router. In these examples, the eight serial interfaces (0 to 7) are on a port adapter in port adapter slot 1; also, most of the status information for each interface is omitted. (Interfaces are administratively shut down until you enable them.)

```
Router# show interfaces serial 1/0
Serial1/0 is up, line protocol is up
  Hardware is M8T-RS232
  Internet address is 10.0.0.0
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
[Additional display text omitted from this example]
```

```
Router# show interfaces serial 1/1
Serial1/1 is up, line protocol is up
  Hardware is M8T-RS232
  Internet address is 10.0.0.1
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
[Additional display text omitted from this example]
```

```
Router# show interfaces serial 1/2
Serial1/2 is up, line protocol is up
  Hardware is M8T-RS232
  Internet address is 10.0.0.2
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
[Additional display text for remaining interfaces omitted]
```

Following is an example of the **show interfaces serial** command, which shows all of the information specific to interface port 0 on a PA-E3 installed in port adapter slot 1:

```
Router# show interfaces serial 1/0
Serial1/0 is up, line protocol is up
  Hardware is M8T-RS232
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
  Last input never, output 1d17h, output hang never
  Last clearing of "show interface" counters never
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    0 packets input, 0 bytes, 0 no buffer
  Received 0 broadcasts, 0 runts, 0 giants
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  24 packets output, 5137 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 output buffer failures, 0 output buffers swapped out
    0 carrier transitions      DCD=down  DSR=down  DTR=down  RTS=down  CTS=down
```

### Cisco 7201 Router—Example Output of the show interfaces Command

Following is an example of the **show interfaces** command from a Cisco 7201 router:

```
Router# show interfaces
GigabitEthernet0/0 is up, line protocol is up
  Hardware is MV64460 Internal MAC, address is 0019.56c5.2adb (bia
0019.56c5.2adb)
  Internet address is 209.165.200.225
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 45/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 1000Mb/s, media type is RJ45
  output flow-control is XON, input flow-control is XON
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:07:03, output 00:00:07, output hang never
  Last clearing of "show interface" counters 00:00:04
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 180240000 bits/sec, 430965 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    2222975 packets input, 133378500 bytes, 0 no buffer
  Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
  0 watchdog, 0 multicast, 0 pause input
  0 input packets with dribble condition detected
  0 packets output, 0 bytes, 0 underruns
  0 output errors, 0 collisions, 0 interface resets
  0 babbles, 0 late collision, 0 deferred
  0 lost carrier, 0 no carrier, 0 pause output
  0 output buffer failures, 0 output buffers swapped out
```

### Cisco 7401ASR Router—Example Output of the show interfaces Command

Following is an example of the **show interfaces serial** command, which shows all of the information specific to interface port 0 on a PA-E3 installed in port adapter slot 1 of a Cisco 7401ASR router:

```
Router# show interfaces serial 1/0
Serial1/0 is up, line protocol is up
  Hardware is M8T-RS232
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
  Last input never, output 1d17h, output hang never
  Last clearing of "show interface" counters never
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    0 packets input, 0 bytes, 0 no buffer
  Received 0 broadcasts, 0 runts, 0 giants
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  24 packets output, 5137 bytes, 0 underruns
  0 output errors, 0 collisions, 0 interface resets
  0 output buffer failures, 0 output buffers swapped out
  0 carrier transitions      DCD=down  DSR=down  DTR=down  RTS=down  CTS=down
```

## VIP in Cisco 7000 Series Routers or Cisco 7500 Series Routers—Example Output of the show interfaces Command

Following are examples of the **show interfaces** command used with the VIP2. In these examples, the eight serial interfaces (0 to 7) are on a port adapter in port adapter slot 1 of a VIP2 in interface processor slot 3; also, most of the status information for each interface is omitted. (Interfaces are administratively shut down until you enable them.)

```
Router# show interfaces serial 3/1/0
Serial3/1/0 is up, line protocol is up
  Hardware is cyBus Serial
  Internet address is 10.0.0.0
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive not set
[Additional display text omitted from this example]
```

```
Router# show interfaces serial 3/1/1
Serial3/1/1 is up, line protocol is up
  Hardware is cyBus Serial
  Internet address is 10.0.0.1
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive not set
[Additional display text omitted from this example]
```

```
Router# show interfaces serial 3/1/2
Serial3/1/2 is up, line protocol is up
  Hardware is cyBus Serial
  Internet address is 10.0.0.2
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive not set
[Additional display text for remaining interfaces omitted]
```

Following is an example of the **show interfaces serial** command, which shows all of the information specific to interface 0 on a port adapter in port adapter slot 1 of a VIP2 in interface processor slot 3:

```
Router# show interfaces serial 3/1/0
Serial3/1/0 is up, line protocol is up
  Hardware is cyBus Serial
  Internet address is 10.0.0.0
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive not set
  Last input 2d18h, output 00:00:54, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/64/0 (size/threshold/drops)
    Conversations 0/1 (active/max active)
    Reserved Conversations 0/0 (allocated/max allocated)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    16 packets input, 1620 bytes, 0 no buffer
    Received 0 broadcasts, 0 runts, 0 giants
    0 input errors, 0 CRC, 0 frame, 0 overrun, 1 ignored, 0 abort
    3995 packets output, 1147800 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 output buffer failures, 0 output buffers swapped out
    1 carrier transitions
  RTS up, CTS up, DTR up, DCD up, DSR up
```

Proceed to the next section, “[Using the ping Command to Verify Network Connectivity](#),” to check network connectivity of the PA-E3 and switch or router.

## Using the ping Command to Verify Network Connectivity

Using the **ping** command, you can verify that an interface port is functioning properly. This section provides a brief description of this command. Refer to the publications listed in the “[Related Documentation](#)” section on page viii for detailed command descriptions and examples.

The **ping** command sends echo request packets out to a remote device at an IP address that you specify. After sending an echo request, the system waits a specified time for the remote device to reply. Each echo reply is displayed as an exclamation point (!) on the console terminal; each request that is not returned before the specified timeout is displayed as a period (.). A series of exclamation points (!!!!) indicates a good connection; a series of periods (.....) or the messages [timed out] or [failed] indicate a bad connection.

Following is an example of a successful **ping** command to a remote server with the address 10.0.0.10:

```
Router# ping 10.0.0.10 <Return>
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 10.0.0.10, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/15/64 ms
Router#
```

If the connection fails, verify that you have the correct IP address for the destination and that the device is active (powered on), and repeat the **ping** command.

Proceed to the next section, “[Using loopback Commands](#),” to finish checking network connectivity.

## Using loopback Commands

Use the **loopback {dte | local | network {line | payload}}** command to troubleshoot the E3 serial port adapter at the physical interface level. The command loops all packets from the E3 interface either back to the interface or from the network back out toward the network. Use the **no** form of the command to remove the loop.

The following examples of the **loopback {dte | local | network {line | payload}}** command configure loopback modes on the single interface (interface 0) of a one-port E3 serial port adapter in port adapter slot 0 of a VIP2 in chassis slot 10 of a Cisco 7500 series router:

To set the interface into loopback data terminal equipment (DTE) mode, which loops the router output data back toward the router (after the line interface unit), use the **loopback dte** command as follows:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
router(config)# interface serial 10/0/0
router(config-if)# loopback dte
```

To set the interface into local loopback mode, which loops the router output data back toward the router at the framer, use the **loopback local** command as follows:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
router(config)# interface serial 10/0/0
router(config-if)# loopback local
```

To set the interface into network line loopback mode, which loops the data back toward the network (before the framer), use the **loopback network line** command as follows:

```
Router# configure terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
router(config)# interface serial 10/0/0  
router(config-if)# loopback network line
```

To set the interface into network payload loopback mode, which loops just the payload data back toward the network at the E3 framer, use the **loopback network payload** command as follows:

```
Router# configure terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
router(config)# interface serial 10/0/0  
router(config-if)# loopback network payload
```